

CLAIMS

1. A polymer-modified resin, comprising:

I) at least one hydroxy-functional or carboxy-functional polyester, and

5 II) at least one glycidyl-containing polyacrylate,

wherein said polyester I comprises an alcohol component containing of from 0.5 to 80 mol% of a didiol fraction, and

wherein said resin is obtained by free-radical polymerization of the starting component(s) for the preparation of said polyacrylate II in the presence of the polyester I in at
10 least one organic solvent.

2. The polymer-modified resin according to Claim 1, wherein said polyester I has an OH number of from 3 to 250 mg KOH/g, an acid number of from 0 to 200 mg KOH/g, a Tg of from -30 to 100°C, a dynamic viscosity, as measured in 75% solution in Solvesso® 150, of
15 from 1 to 40 Pa·s, and an OH functionality of from 1 to 10.

3. The polymer-modified resin according to Claim 1, wherein said polyester I has an OH number of from 10 to 150 mg KOH/g, an acid number of from 0 to 75 mg KOH/g, a Tg of from -20 to 40°C, a dynamic viscosity, as measured in 75% solution in Solvesso® 150, of
20 from 1 to 20 Pa·s, and an OH functionality of from 2 to 5.

4. The polymer-modified resin according to Claim 1, wherein said polyester I has an OH number of from 30 to 50 mg KOH/g, an acid number of from 0 to 50 mg KOH/g, a Tg of from -10 to 20°C, a dynamic viscosity, as measured in 75% solution in Solvesso® 150, of
25 from 1 to 10 Pa·s, and an OH functionality of from 2 to 4.

5. The polymer-modified resin according to Claim 1, wherein said dicidol comprises an isomer mixture of X,Y-bis(hydroxymethyl)tricyclo[5.2.2.0^{2,6}]decane.

6. The polymer-modified resin according to Claim 1, wherein said dicidol comprises
5 a mixture of the isomeric compounds 3,8-bis(hydroxymethyl)tricyclo-[5.2.1.0^{2,6}]decane, 4,8-bis (hydroxymethyl)tricyclo[5.2.1.0^{2,6}]decane and 5,8-bis(hydroxymethyl)tricyclo[5.2.1.0^{2,6}]decane.

wherein each isomer is present in said mixture in a fraction of from 20 to 40% by weight, the sum of the three isomers being from 90 to 100% by weight.

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7. The polymer-modified resin as claimed in claim 4 or 5, further comprising up to 10% of isomers of dicidol, trimeric isomeric diols of the Diels-Alder reaction product of cyclopentadiene, higher isomeric diols of the Diels-Alder reaction product of cyclopentadiene or mixtures thereof.

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8. The polymer-modified resin according to Claim 1, wherein the alcohol component of polyester I is a compound selected from the group consisting of ethylene glycol, 1,2-propanediol, 1,3-propanediol, diethylene, dipropylene, triethylene and tetraethylene glycol, 1,2-butanediol, 1,4-butanediol, 1,3-butylethylpropanediol, 1,3-methylpropanediol, 1,5-
20 pentanediol, cyclohexanedimethanol, glycerol, hexanediol, neopentylglycol, trimethylolethane, trimethylolpropane, pentaerythritol, bisphenol A, bisphenol B, bisphenol C, bisphenol F, norbornylene glycol, 1,4-benzylidimethanol, 1,4-benzylidiethanol, 2,4-dimethyl-2-ethylhexane-1,3-diol, and mixtures thereof.

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9. The polymer-modified resin according to Claim 1, wherein the acid component of polyester I is a compound selected from the group consisting of phthalic acid, isophthalic

acid, terephthalic acid, 1,2-cyclohexanedicarboxylic acid, 1,4-cyclohexanedicarboxylic acid, succinic acid, sebacic acid, methyltetrahydrophthalic acid, methylhexahydrophthalic acid, tetrahydrophthalic acid, dodecanedioic acid, adipic acid, azelaic acid, naphthalenedicarboxylic acid, pyromellitic acid, trimellitic acid, anhydride of phthalic acid, anhydride of isophthalic acid, anhydride of terephthalic acid, anhydride of 1,2-cyclohexanedicarboxylic acid, anhydride of 1,4-cyclohexanedicarboxylic acid, anhydride of succinic acid, anhydride of sebacic acid, anhydride of methyltetrahydrophthalic acid, anhydride of methylhexahydrophthalic acid, anhydride of tetrahydrophthalic acid, anhydride of dodecanedioic acid, anhydride of adipic acid, anhydride of azelaic acid, anhydride of naphthalenedicarboxylic acid, anhydride of pyromellitic acid, anhydride of trimellitic acid, lower alkyl esters of phthalic acid, lower alkyl esters of isophthalic acid, lower alkyl esters of terephthalic acid, lower alkyl esters of 1,2-cyclohexanedicarboxylic acid, lower alkyl esters of 1,4-cyclohexanedicarboxylic acid, lower alkyl esters of succinic acid, lower alkyl esters of sebacic acid, lower alkyl esters of methyltetrahydrophthalic acid, lower alkyl esters of methylhexahydrophthalic acid, lower alkyl esters of tetrahydrophthalic acid, lower alkyl esters of dodecanedioic acid, lower alkyl esters of adipic acid, lower alkyl esters of azelaic acid, lower alkyl esters of naphthalenedicarboxylic acid, lower alkyl esters of pyromellitic acid, lower alkyl esters of trimellitic acid, and mixtures thereof.

10. The polymer-modified resin according to Claim 1, wherein the polyacrylate II has an OH number of from 0 to 300 mg KOH/g, an acid number of from 0 to 300 mg KOH/g, an epoxidically attached oxygen content of from 0.05 to 10 wt.%, a Tg of from -40 to 120°C, a dynamic viscosity, as measured in 60% solution in Solvesso® 150, of from 0.2 to 40 Pa·s, an Mn of from 1 000 to 100 000 g/mol, and an Mw of from 2 000 to 1 000 000 g/mol.

11. The polymer-modified resin according to Claim 1, wherein the polyacrylate II has an OH number of from 20 to 150 mg KOH/g, an acid number of from 0 to 50 mg KOH/g, an epoxidically attached oxygen content of from 0.3 to 3.0 wt.%, a Tg of from -30 to 40°C, a dynamic viscosity, as measured in 60% solution in Solvesso® 150, of from 0.5 to 15 Pa·s, an
5 Mn of from 1 000 to 10 000 g/mol, and an Mw of from 3 000 to 100 000 g/mol.

12. The polymer-modified resin according to Claim 1, wherein the polyacrylate II has an OH number of from 40 to 140 mg KOH/g, an acid number of from 0 to 20 mg KOH/g, an epoxidically attached oxygen content of from 0.3 to 2.0 wt.%, a Tg of from -20 to 30°C, a
10 dynamic viscosity, as measured in 60% solution in Solvesso® 150, of from 0.5 to 10 Pa·s, an Mn of from 1 000 to 6 000 g/mol, and an Mw of from 5 000 to 20 000 g/mol.

13. The polymer-modified resin according to Claim 1, wherein the polyacrylate II is prepared from at least one glycidyl-containing monomer and at least one monomer selected
15 from the group consisting of styrene, acrylic acid, methacrylic acid, C₁-C₄₀ alkyl esters of methacrylic acid and acrylic acid, hydroxyalkyl acrylates, hydroxyalkyl methacrylates and mixtures thereof

14. The polymer-modified resin according to Claim 1, wherein said starting
20 components are selected from the group consisting of glycidyl methacrylate, glycidyl acrylate, 1,2-epoxybutyl acrylate, 1,2-epoxybutyl methacrylate, 2,3-epoxycyclopentyl acrylate, 2,3-epoxycyclopentyl methacrylate, styrene, acrylic acid, methacrylic acid, methyl methacrylate, 2-hydroxyethyl acrylate, 2-hydroxyethyl methacrylate, butyl acrylate, butyl methacrylate and mixtures thereof.

15. The polymer-modified resin according to Claim 1, having an OH number of from 0 to 250 mg KOH/g, an acid number of from 0 to 200 mg KOH/g, an epoxide oxygen content of 0.05 to 10 wt.%, a Tg of from -40 to 120°C, and a dynamic viscosity, as measured in 60% solution in Solvesso® 150, of from 0.2 to 40 Pa.s.

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16. The polymer-modified resin according to Claim 1, having an OH number of from 20 to 150 mg KOH/g, an acid number of from 0 to 50 mg KOH/g, an epoxide oxygen content of 0.3 to 3 wt.%, a Tg of from -30 to 40°C, and a dynamic viscosity, as measured in 60% solution in Solvesso® 150, of from 0.5 to 15 Pa.s.

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17. The polymer-modified resin according to Claim 1, having an OH number of from 40 to 140 mg KOH/g, an acid number of from 0 to 20 mg KOH/g, an epoxide oxygen content of 0.3 to 2 wt.%, a Tg of from -20 to 30°C, and a dynamic viscosity, as measured in 60% solution in Solvesso® 150, of from 0.5 to 10 Pa.s.

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18. The polymer-modified resin according to Claim 1, comprising:

- I.) from 10 to 90% by weight of polyester; and
- II.) from 90 to 10% by weight of polyacrylate.

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19. The polymer-modified resin according to Claim 1, comprising:

- I.) from 30 to 80% by weight of polyester; and
- II.) from 70 to 20% by weight of polyacrylate.

20. The polymer-modified resin according to Claim 1, comprising:

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- I.) from 60 to 80% by weight of polyester; and
- II.) from 40 to 20% by weight of polyacrylate.

21. The polymer-modified resin according to Claim 1, wherein the acid component of said polyester I comprises in ester form

60 – 100 mol% of (cyclo)aliphatic dicarboxylic acids,

0 – 40 mol% of aromatic dicarboxylic acid,

0 – 40 mol% of further (cyclo)aliphatic dicarboxylic acid, and

0 – 10 mol% of higher polyfunctional carboxylic acid; and

wherein the alcohol component of said polyester I comprises in ester form

10 – 60 mol% of neopentylglycol,

10 – 60 mol% of monoethylene glycol,

0 – 20 mol% of trimethylolpropane,

0.5 to 80 mol% of didiol, and

0 - 79.5 mol% of further (cyclo)aliphatic alcohol component; and

wherein a sum of the acid components and a sum of the alcohol components each on

its own adds up to 100 mol%.

22. The polymer-modified resin according to Claim 1, wherein the acid component of said polyester I comprises in ester form

60 - 100 mol% of 1,2-cyclohexanedicarboxylic anhydride,

0 – 40 mol% of aromatic dicarboxylic acid,

0 – 40 mol% of further (cyclo)aliphatic dicarboxylic acid, and

0 – 10 mol% of higher polyfunctional carboxylic acid; and

wherein the alcohol component of said polyester I comprises in ester form

10 – 60 mol% of neopentylglycol,

10 – 60 mol% of monoethylene glycol,

0 – 20 mol% of trimethylolpropane,

0.5 - 80 mol% of dicidol, and

0 - 79.5 mol% of further (cyclo)aliphatic alcohol component.

5 23. The polymer-modified resin according to Claim 1, wherein the polyacrylate II comprises the following monomers in copolymerized form

10 - 40 mol% of butyl acrylate and/or butyl methacrylate,

10 - 40 mol% of glycidyl methacrylate and/or (meth)acrylic acid,

10 - 80 mol% of methyl methacrylate,

10 0 - 50 mol% of styrene, and

0 - 70 mol% of further α , β -unsaturated monomers.

15 24. The polymer-modified resin according to Claim 1, wherein the polyacrylate II comprises the following monomers in copolymerized form

10 - 40 mol% of butyl acrylate and/or butyl methacrylate,

10 - 40 mol% of glycidyl methacrylate and/or (meth)acrylic acid,

10 - 80 mol% of methyl methacrylate,

5 - 40 mol% of hydroxyethyl acrylate and/or hydroxyethyl methacrylate,

20 0 - 40 mol% of acrylic acid and/or methacrylic acid,

0 - 50 mol% of styrene, and

0 - 65 mol% of further α , β -unsaturated monomers.

25 25. A process for preparing a polymer-modified resin, comprising:

free-radical polymerizing ethylenically unsaturated monomers in the presence of a) at least one polyester having at least one hydroxy-functional or carboxy-functional group, and b) at least one organic solvent, to obtain at least one glycidyl-containing polyacrylate; and

wherein said polyester comprises an alcohol component containing of from 0.5 to

5 80 mol% of didiol.

26. A binder, comprising:

a polymer-modified resin according to Claim 1.

10 27. An adhesive, comprising:

a polymer-modified resin according to Claim 1.

28. A coating composition, comprising:

a polymer-modified resin according to Claim 1.

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29. The binder as claimed in claim 26, further comprising polyisocyanate, polycarboxylic acid, polyanhydride, polyamine, melamine-formaldehyde resin crosslinker or mixtures thereof.